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10/797,513

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Brian S. Higgins

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09/02/2008

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EXAMINER

SUERETH, SARAH ELIZABETH

ART UNIT

PAPER NUMBER

3749

MAIL DATE

DELIVERY MODE

09/02/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/797,513 | Applicant(s) HIGGINS, BRIAN S. | |
| | Examiner Sarah Suereth | Art Unit 3749 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Receipt of applicant's amendment filed on 03/17/08 is acknowledged..

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/17/08 has been entered.

Terminal Disclaimer

3. The terminal disclaimer filed on 3/17/08 has been reviewed and is accepted.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 17-34 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 17, line 5 states, "determining if the SCR system is to be by-passed". However, this is a mental step which does not produce a

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concrete or tangible result, and thus is nonstatutory. A similar limitation is also in claim 25.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 17-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 17, line 5 states, "determining if the SCR system is to be by-passed". A similar limitation is also in claim 25.

8. However, the specification does not describe how this step is performed.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 17-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 17, line 5 states, "determining if the SCR system is to be by-passed". A similar limitation is also in claim 25.

11. However, it is unclear exactly how this step is performed. For example, it is unclear whether a user or a controller performs the step, or what criteria is used to make a determination.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. **Claims 17-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over **U.S. Patent No. 4,375,949 to Salooja** ("Salooja") in view of **U.S. Patent No. 4,029,752 to Cahn** ("Cahn"), and **applicant's admitted prior art**, and further in view of **U.S. Patent No. 4,196,057 to May** ("May") (previously cited) and **Altman (5,011,516)**.

Salooja discloses in the specification and figures 1-10 an invention in the same field of endeavor as applicant's invention and similar to that described in applicant's claims 17-34.

In particular, in regard to at least claim 17, Salooja discloses a method of reducing the acidity (each of nitrogen oxides and sulfur trioxides, see cols. 5-7) comprising the steps of:

c) partially combusting the fuel in a first stage to create a reducing environment in situ (see at least col. 1, lines 50-54);

d) maintaining the reducing environment for a sufficient time period such that reducible acids are reduced to a predetermined level to achieve a desirable acidity concentration in the flue gas (see at least col. 1, lines 54-59 and col. 7 lines 5-20 describing that the nitrogen oxides and sulfur tri-oxides are controlled to desired/predetermined levels);

e) combusting the remainder of the fuel and combustion intermediates in a second stage with oxidizing environment; thereby decreased the acidity of the flue gas by reducing the acid concentration of the gas (see at least col. 1, lines 60-63 and lines 29-33).

In regard to the limitation the reducible acids are reduced "by electron addition", while Salooja does disclose that the nitrogen oxides and sulfur trioxides are reduced, the reference does not appear to go into further detail as to the mechanisms of the chemical reduction, namely "by electron addition."

Cahn teaches a method of reducing sulfur oxides that is considered to be in the same field of endeavor as both applicant's invention and Salooja. Cahn describes that sulfur oxides in a process gas stream are reduced by reaction with ammonia (i.e. NH_3) as a reducing agent (see at least col. 7, lines 48-52). Cahn clearly provides that sulfur trioxide is reduced in the same manner as the described processes for sulfur dioxide (see at least col. 7, lines 34-38). The examiner notes that at least ammonia (NH_3) is considered to be the type of reducing radical described in applicant's specification (see specification p. 9, line 14 lists NHi). Further, the examiner also notes that Cahn also suggests that other reducing agents such as H_2 , CO , and CH_4 (also listed in applicant's

specification) are recognized in the art as reducing radicals creating a reducing environment (see Cahn, col. 7, lines 65-68). This describes process of employing either ammonia or other above noted agent to result in the reduction of sulfur trioxide (a reducible acid) is considered to suggest the reduction by electron addition described in applicant's specification and claimed in claim 17.

Returning to Salooja, while this reference provides only some detail of the reducing of sulfur trioxides through the practice of the described method, there is clear suggestion that the reduction of sulfur trioxides is recognized in the art. Accordingly, a person of ordinary skill in the art at the time the invention was made would desirably modify the process in Salooja to incorporate the reduction by electron addition suggested by Cahn to desirably produce a gas stream that has "little or no" sulfur trioxide (see at least Cahn, col. 8, lines 41-46).

Regarding the limitations of determining if the SCR system is to be bypassed and then bypassing the SCR if determined to be necessary, applicant discloses in the specification that "an SCR is often only intended to be used for six months per year", and "are bypassed during the winter". This is regarded as an admission of prior art.

Salooja, Cahn, and applicant's admitted prior art teach substantially all of the limitations of the methods recited in claims 17-23 and 25-31, with exception of the steps of adjusting the reducing environment to lower the flue acid gas dewpoint (claims 17 and 23), improving ESP function (claims 17 and 25), and measuring acid dewpoint (claim 23). These additional steps have not been identified in Salooja, Cahn, and applicant's admitted prior art.

However, In regard to claims 17 and 25, the acid of concentration of the flue gas is directly related to the acid dew point temperature of the flue gas. This is expressly noted by applicant in applicant's description of the prior art, namely "...as the SO₃ concentration increases, the acid dew point temperature of the flue gas increases." (see applicant's specification, p. 1, lines 16-18). To further support this assertion the examiner also points to May. May discloses a method which provides that "[m]easurement of dew point enables a semi-quantitative determination of the sulfur trioxide concentration in the exhaust or flue gas" (see May, col. 5, lines 30-32 and 38-42). Accordingly, a person of ordinary skill in the art would understand that reduction of the acid concentration of the flue gas necessarily results in the lowering of the acid dew point level of the flue gas. As noted above, Salooja provides for the reduction of sulfur oxides from the effluent of flue gas of a furnace to a desired level (see at least col. 1, lines 54-59 and cols. 5-7). Therefore, a person of ordinary skill in the art would reasonably understand that obtaining the reduction target of the oxides in the flue gas as specified in Salooja would necessarily result in a corresponding desired dew point level (again see at least May, col. 5, lines 38-42).

Also in regard to claims 17 and 25, it is unclear whether the Salooja apparatus includes an ESP device. However, Altman teaches that fly ash is conventionally removed from combustion gases by electrostatic precipitation (col. 1, lines 7-10). Altman also teaches that the concentration of sulfur trioxide must be controlled to optimize the performance of the ESP filter (col. 1, lines 17-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Salooja apparatus to include the ESP device, as Altman teaches they are conventionally used to control fly ash (col. 1, lines 7-10).

Accordingly, a person of ordinary skill in the art would understand that reduction of the acid concentration of the flue gas necessarily results in optimizing the performance of an ESP device. As noted above, Salooja provides for the reduction of sulfur oxides from the effluent of flue gas of a furnace to a desired level (see at least col. 1, lines 54-59 and cols. 5-7). Therefore, a person of ordinary skill in the art would reasonably understand that obtaining the reduction target of the oxides in the flue gas as specified in Salooja would necessarily result in a corresponding improved performance of the ESP device (again see at least Altman, col. 1, lines 17-21).

In regard to at least claim 18 and 19, Salooja describes that a catalytic burner is supplied at least in the first stage that produces lower NO_x production than conventional combustion systems (see at least col. 2, lines 7-12, col. 6, line 67 through col. 7, line 4 and col. 4, lines 31-47) and thus reasonably suggests micro-staging through the use of low-NO_x burners.

In further regard to claims 18 and 19, as noted above, while the examiner considers that the operation of the catalytic burners suggests the recited micro-staging using low NO_x burners, even if this is not a proper understanding, the examiner notes that applicant admits that the use of micro-staging using low-NO_x burners to reduce emissions in combustion furnaces is known in the art (see admitted prior art of page 5,

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lines 4-18 of applications' specification). Accordingly, even if the operation of the catalytic burners of Salooja are not properly considered to be applicant's recited micro-staging using low NOx burners, a person of ordinary skill in the art would desirably seek to incorporate micro-staging using low NOx burners in the process of Salooja in order to desirably aid in reducing NOx emissions (see admitted prior art of p. 5, lines 4-18 of applications' specification).

In regard to at least claims 20-24 and 26-31, applicant also admits that the use of macro-staging using over-fired air and used in combination with micro-staging using low NOx burners is known in the art (see admitted prior art of page 5, line 19 through page 6, line 5 of applications' specification). Accordingly, a person of ordinary skill in the art would seek to employ macro-staging using over-fired air in a combustion stage and/or in combination of micro-staging using low NOx burners to desirably achieve NOx emissions reduction (see admitted prior art of page 5, line 19 through page 6, line 5 of applications' specification). Regarding claim 24, Salooja teaches burning a "carbonaceous fuel", which is considered to suggest coal.

Regarding claims 33 and 34, Salooja teaches reducing the concentration of sulfur trioxide to 18 ppm (col. 7, line 17).

In regard to claim 25, this claim includes limitations similar to that of claim 17 with the additional method step of "measuring the acid dewpoint of the flue gas." Salooja possibly does not expressly disclose actively measuring the acid dewpoint of the flue gas.

However, May, as previously noted, clearly provides that the dew point of the exhaust gas is measured to determine a concentration of sulfur trioxide (see May, col. 5, lines 30-32). Further, May provides that the measurement of the dew point also allows for determination of "cold end" corrosion locations (May, col. 5, lines 32-34) and further that the inherent corrosion rate measurement that arises from the dewpoint measurement "indicates the degree of inhibition of an additive such as magnesium and the actual condition at the surface." (May, col. 5, lines 34-37).

Accordingly, a person of ordinary skill in the art would desirably modify the method of Salooja to incorporate measuring the acid dewpoint of the flue gas as taught in May to determine the level of corrosion that results from the additives in the flue gas (see May, col. 5, lines 30-37).

Response to Arguments

14. Applicant's arguments with respect to claims 17-34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Suereth whose telephone number is (571)272-9061. The examiner can normally be reached on Mondays & Tuesdays 8:00AM-4:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven McAllister, can be reached (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sarah Suereth/
Examiner, Art Unit 3749

/Steven B. McAllister/
Supervisory Patent Examiner, Art Unit 3749